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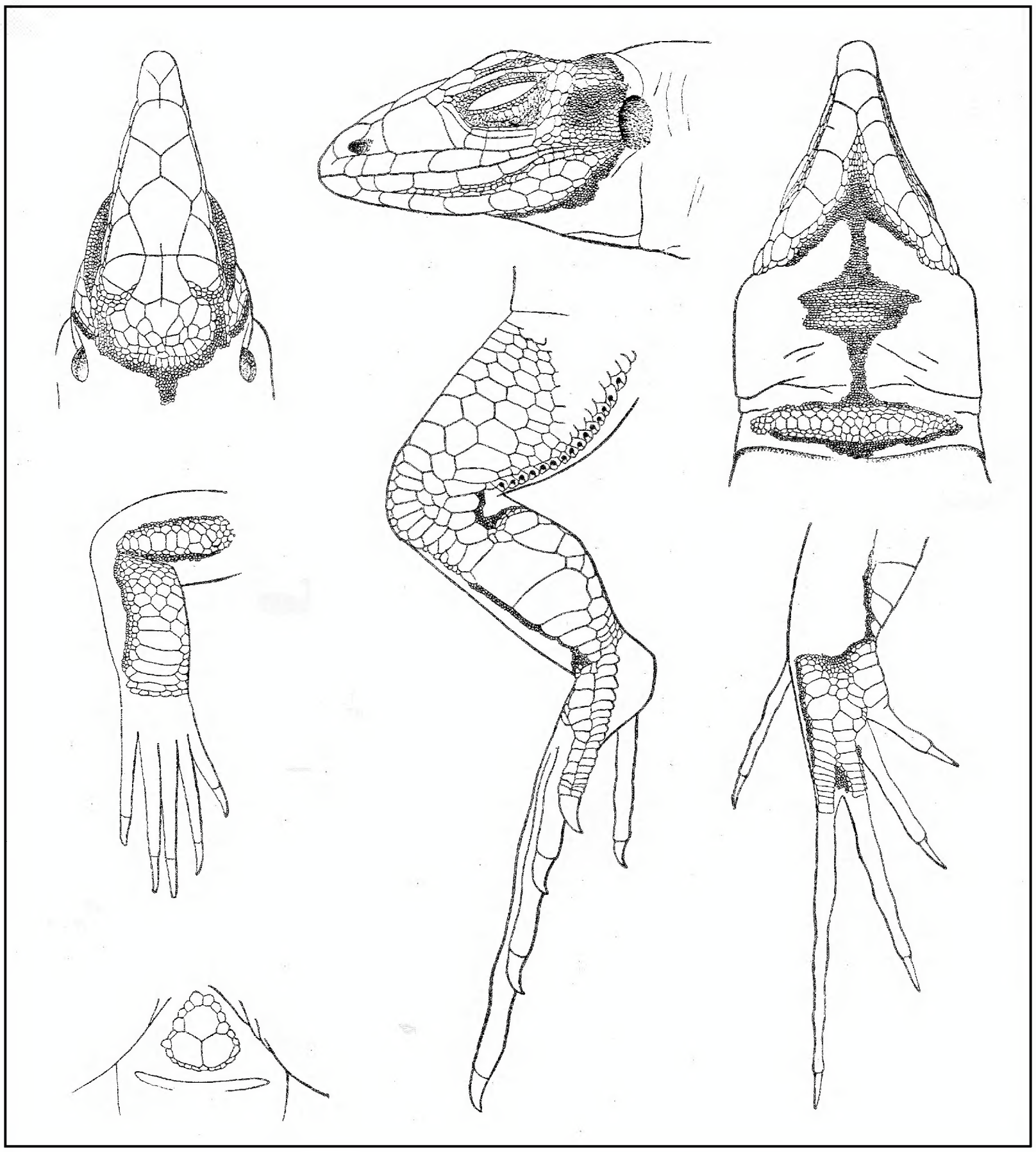

BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY
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Notes on Mexican Herpetofauna 17: The Status of *Rhadinaea montana*, *R. gaigeae* and *R. quinquelineata* of the Sierra Madre Oriental of Eastern Mexico . . . . . James R. Dixon , David Lazcano, Javier Banda-Leal and Jerónimo A. Chávez-Cisneros 69

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Cover: Common Puerto Rican ameiva, *Ameiva exsul*. Drawing from *The Herpetology of Porto Rico* by Leonhard Stejneger, pp. 549-724 in the Annual Report of the United States National Museum for 1902 (issued in 1904).

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Notes on Mexican Herpetofauna 17: The Status of *Rhadinaea montana*, *R. gaigeae* and *R. quinquelineata* of the Sierra Madre Oriental of Eastern Mexico

James R. Dixon[1], David Lazcano[2], Javier Banda-Leal[2] and Jerónimo A. Chávez-Cisneros[2]

Introduction

For about 20 years, JRD and DL have been accumulating external data on a series of small snakes (*Rhadinaea gaigeae* Bailey 1937; *R. montana* Smith 1944; and *R. quinquelineata* Cope 1886) found along the eastern face of the Sierra Madre Oriental, Mexico.

Over the past few years, the late E. A. Liner made a special effort to study the herpetofauna of the Mexican state of Nuevo León, and in that effort he and his colleagues assembled a number of *R. montana*. These have been reported in the literature (Chaney and Liner, 1986, 1990; Liner, 1996a, b; Liner and Chaney, 1987). Bailey (1940) reported on the species of the genus known at that time, and Myers (1974) followed with a review of all species in the genus for his dissertation. McCoid and Dixon (1981) reported on the third known extant specimen of *R. quinquelineata*, and the first known specimen of *R. crassa* (now = to *R. gaigeae*) from Guanajuato.

These three species are found at various elevations from about the latitude of Monterrey, Mexico (25°29'N) to Teziutlán, Mexico (19°49'N), a linear distance of about 685 km. According to Myers (1974), these species of snakes belong to the *R. decorata* group, and specifically to the series *montana*, *gaigeae*, *quinquelineata*, *forbesi* subgroup. Myers defines the subgroup as having a "tendency for a pale grayish stripe or streak (absent in *forbesi*) on each side of a well-defined vertebral dark line. Often there is a short white line on the midline of the nape, in front of the vertebral dark line. Except for *forbesi*, there is a tendency for a relatively high number of ventrals and lack of encroachment of the dorsal ground color onto the ventral tips, which, however, may be dotted or spotted with dark pigment."

At the time Myers published his opus on the genus *Rhadinaea*, he had examined one specimen of *quinquelineata* (the lectotype), 85 specimens of *gaigeae*, 4 of *montana*, and 10 specimens of *forbesi*. We have not included *forbesi* in our analysis. It is obvious to us that *.forbesi* is distinct from the other three species in the subgroup by having a different color pattern, (as described by Myers, 1974:76), and significantly different numbers of ventrals and subcaudals. Males and females of *forbesi* have 136–149 ventrals, and 56–67 subcaudals. There are no significant differences between the ventrals and subcaudals of *gaigeae*, *montana* and *quinquelineata* (noted by Myers (1974:58). The ventral and subcaudal counts vary in a linear fashion from south to north, with the lowest numbers found in the south. *Rhadinaea quinquelineata*, the southern taxon, with only two extant specimens (male and female), have 166-179 ventrals and 76-92 subcaudals,; *R. gaigeae* have 156–184 ventrals, 81–112 subcaudals; and *R. montana* have 161–186 ventrals, 98–116 subcaudals. According to Myers, the strongest differences among the three species are in the color pattern.

Materials and Methods

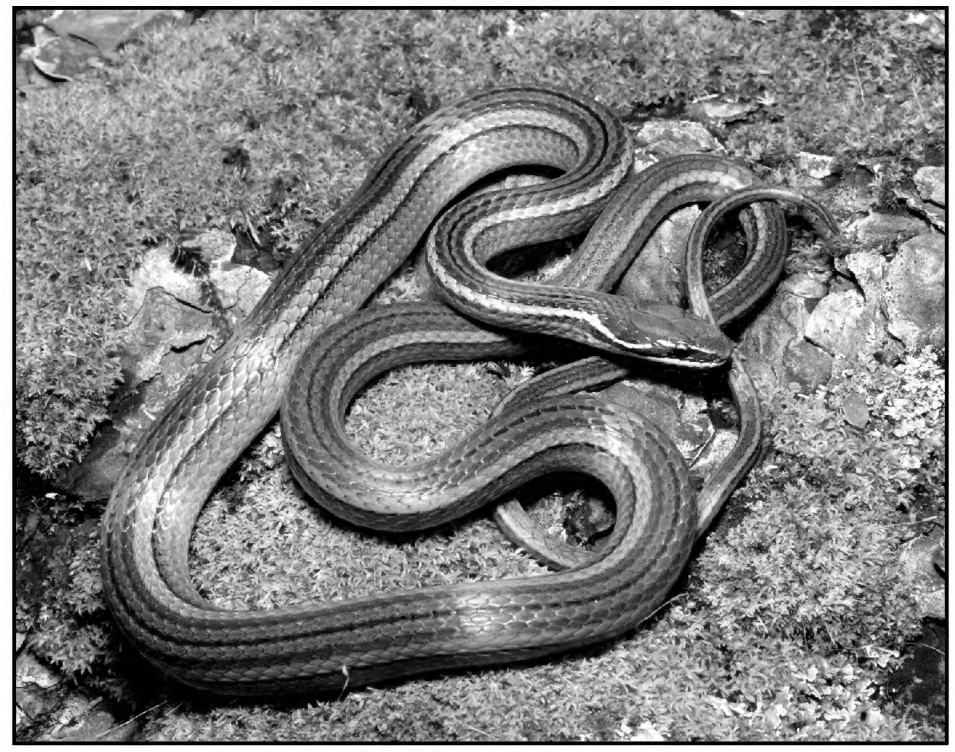
We have examined all available material of *R. montana* at the Universidad Autónoma de Nuevo León (UANL) collection, consisting of 27 specimens from Nuevo León and 3 specimens of *R. gaigeae* from Tamaulipas. In addition, we examined one specimen of *R. quinquelineata* in the Texas Cooperative Wildlife Collection (TCWC) from the Mexican state of Puebla, and the lectotype (United States National Museum 31350) from Puebla; 23 *R. gaigeae* in the TCWC from the states of Hidalgo, Queretaro, Guanajuato, Tamaulipas, and one from Tamaulipas from the University of Kansas collection.

Midbody scale patterns of specimens were illustrated where the pattern varied from various localities throughout the range of each species. Individual numbers from specimens where the patterns were duplicated by other specimens were also recorded, regardless of locality. Lateral head patterns were also illustrated where individuals differed slightly from each other.

Data taken included counts of the ventrals, subcaudals, supra- and infralabials, pre-and postoculars, temporals and loreals. Also noted were presence of a small presubocular, condition of anal plate, sex, number of scale rows (at midbody, at 10 ventrals posterior to last gular and at 10 ventrals anterior to vent). Measurements of total length and tail length (in millimeters) were made where possible.

Results

Our morphometric and qualitative data for *R. montana* (23) has expanded the variation found in the species. The number of ventrals in males range from 161 to 182 ($\bar{x}$ = 171.2). females 172 to 186 ($\bar{x}$ = 178.2); male subcaudals 98 to 116 ($\bar{x}$ = 106.3),



A specimen of *Rhadinaea montana* from Nuevo León. Photograph by Robert Hansen

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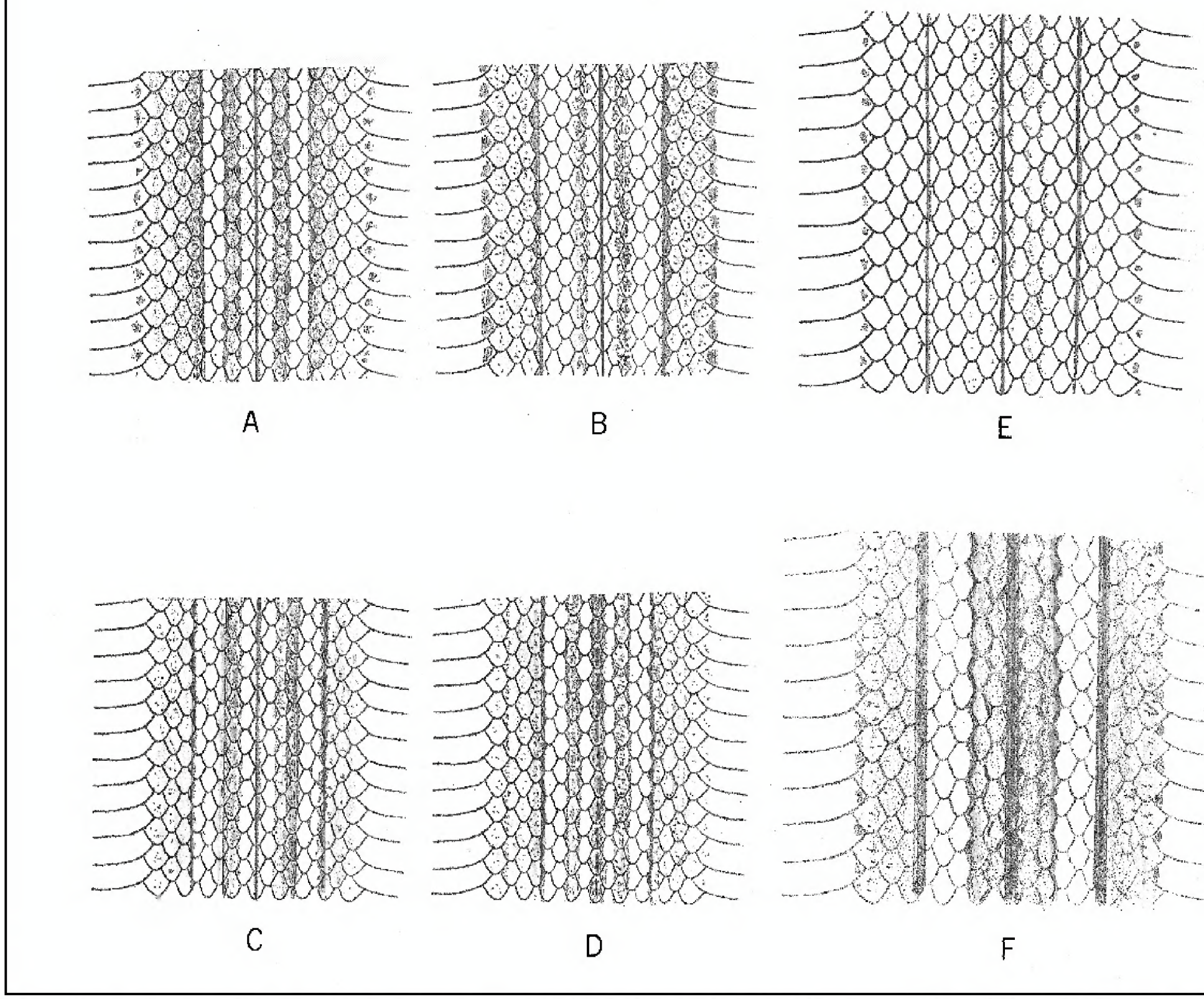


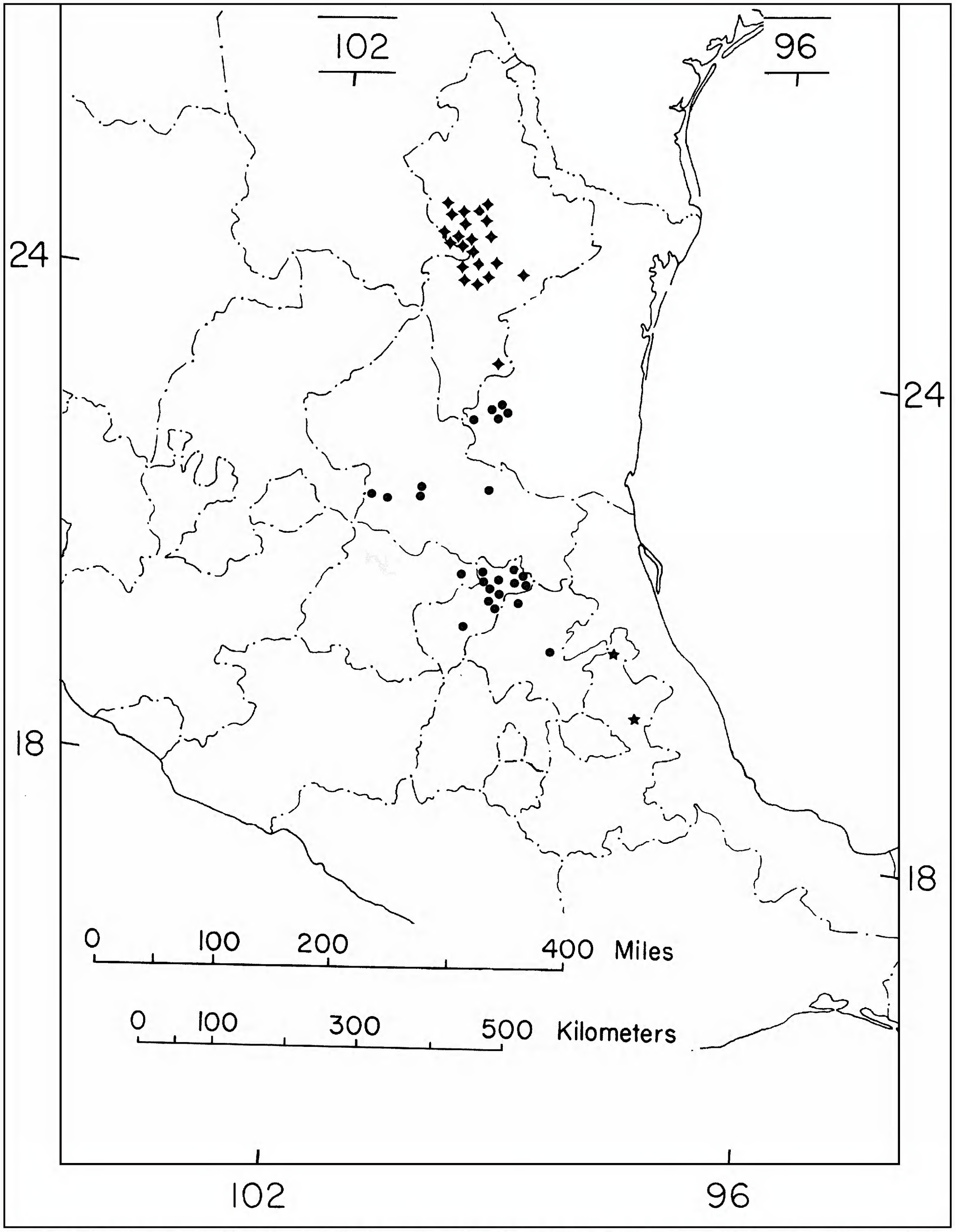
Figure 1. Midbody pattern illustrations: **A)** *Rhadinaea montana* UANL 5842 from Cañón de San Isidro, Santiago, Nuevo León, and **B)** *R. quinquelineata* TCWC 54863 from Puebla. **C)** *R. montana* UANL 5559 from Parque Ecológico Chipinque, San Pedro Garza García, Nuevo León, and **D)** and *R. montana* UANL 3822 from 1.5 km La Trinidad, Montemorelos, Nuevo León, showing various widths of the mid-dorsal stripe. **E)** *R. gaigeae* UANL 4221 from the Ocampo–Tula road, western Tamaulipas, and **F)** *R. gaigeae* TCWC 29514 from El Madroño, eastern Querétaro, illustrating the three dark stripe and five dark stripe patterns.

females 74 to 106 ($\bar{x}$ = 101.6); supralabials normally 8, rarely 7 or 9 on one side; infralabials normally 10, rarely 11 on one side; preoculars normally 1, rarely 1-2, or 2-2; a tiny presubocular is present one or both sides 48.2% of the time; postoculars 2-2; temporals are always 1+2; and loreals 1; tail length as a ratio of total length is about 33.5% in males, and 31.2% in females. Our data for *R. gaigeae* falls with the variation presented by Myers (1974:58), and the data for our single specimen of *R. quinquelineata* has been reported by McCoid and Dixon (1981:346).

According to Myers (1974), an analysis of midbody color patterns should be sufficient to separate the three species presented above. This was obviously true when there were only a few specimens to be concerned about, but with the addition of many more individuals of *R. montana*, the patterns of the three species are merging into various local variations. For example, some individuals of *R. montana* have a relatively wide mid-dorsal dark stripe that covers the entire 9th scale row, (Figure 1D) while others may have only the middle forth of the mid-dorsal row covered with dark color (Figure 1C). The majority of *R. montana* tend to have three well defined dark stripes, similar to *R. gaigeae*, but in *R. montana* scale rows 7 have a dark diffuse stripe similar to that found in *quinquelineata*, (Figure 1B) but more distinct (Figure 1A). Scale row 7 in *R. gaigeae* is darker than scale rows 5 and 6, usually slightly more pale than scale row 8, and usually lacks any indication of a dark distinct or obscure line that is present in both *quinquelineata* and *montana*. However, some individuals of *gaigeae* have obscure dark areas on scale row 7 (Figure 1F) Some *gaigeae* from the western slopes of the Sierra Madre Oriental in Tamaulipas are very pale, and have 3 dark lines on scale rows 4, 9 and 4, with no indication of secondary darker lines on any other scales (Figure 1E). This pattern is present in the specimen from Guanajuato (see McCoid and Dixon, 1981: figure 1).

Habitat

The habitat where *Rhadinaea* occurs along the eastern front



Distribution of *Rhadinaea montana* (black diamonds), *Rhadinaea gaigeae* (black dots) and *Rhadinaea quinquelineata* (black stars) along the eastern front range of the Sierra Madre Oriental of Mexico.

range of the Sierra Madre Oriental is drier to the north and somewhat moister to the south, but with the same basic overstory of dominant vegetation that grows over an underlying geologic block of limestone that is eroded and broken by fissures and streams. The three major plant formations are given below.

Submontane Matorral Biotic Plant Community: a very rich, bushy formation, easily distinguishable from others. The size and distribution of the dominant and codominant species depends highly on water disposition, soil thickness and fertility. This community covers the lower slopes (600–1200 m), which are widely distributed within the Sierra Madre Oriental, and is differentiated from subhumid forests found on the higher mountain slopes (1200–2000 m). The most abundant and dominant species found throughout the entire range of this community are: *barreta* (*Helietta parvfolia*), *anacahuita* or Texas olive (*Cordia boissieri*), *tenaza* or ape's earring (*Pithecellobium pallens*) and *chapparo prieto* or blackbrush acacia (*Acacia rigidula*). In some areas of low humidity, rocky calcite and mainly thin soils, thorny species dominate. These species are *huizache* or sweet acacia (*Acacia farnesiana*), *hierba del potro* or Mexican halfback (*Caesalpinia mexicana*) and mesquite or honey mesquite (*Prosopis glandulosa*).

Pine-Oak Forest Biotic Plant Community: found from 1075 to 2220 m. This is an open, pine-dominated forest community with species from 10 to 20 m in height. The pines are rarely found in pure stands (some areas in the Sierra Madre Oriental in high altitude might still hold ground for pure pine species), but rather are associated with oak species and madrones (*Arbutus xalapensis*) of the area. The characteristic pine species are: *pino colorado* or twisted-leaf pine (*Pinus tecocote*) and *pino blanco* or white pine (*Pinus pseudostrobus*). Some of the oak forest elements are found in moderate density such are: *encino de astas* or loquat-leaf oak (*Quercus rysophylla*), *encino roble* or Mexican white oak (*Q. polymorpha*), *encino memelito* or Lacey oak (*Q. laceyi*), *encino molino* or live oak (*Q. virginiana* var. *fusiformis*), *encino duraznillo* or Canby oak (*Q. canbyi*) and *encino blanco* or white oak (*Q. laeta*). Depending on the mountain location throughout the Sierra Madre Oriental other pine species could be present.

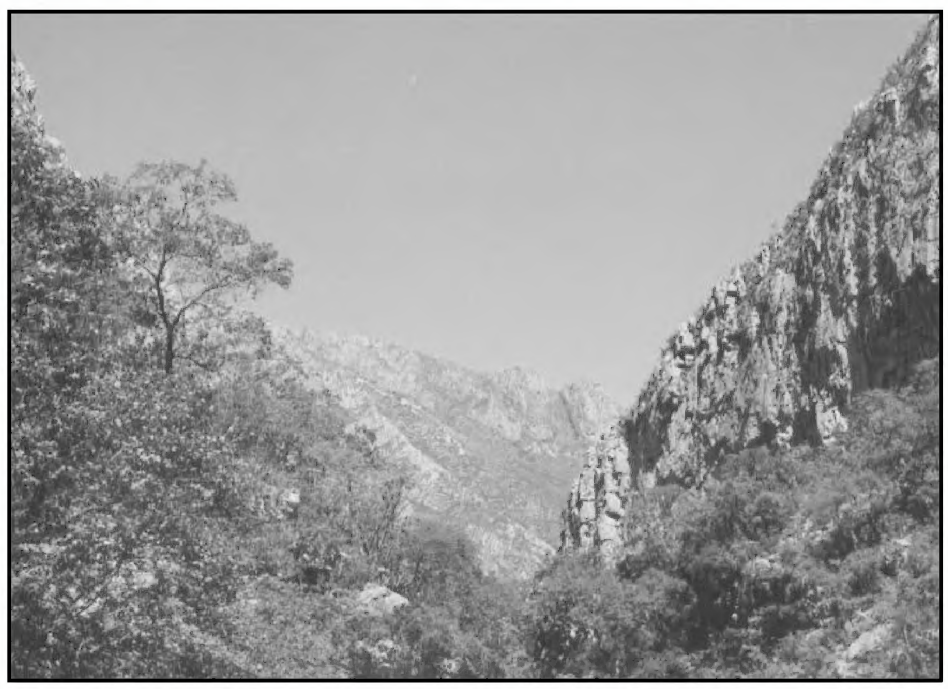
Oak-Pine Forest Biotic Plant Community: most abundant at elevations from 975 to 2200 m. The main elements of the oak portion of the forest are various species of *Quercus*. The typical species are: *encino de astas* or loquat-leaf oak (*Q. rysophylla*), *encino roble* or Mexican white oak (*Q. polymorpha*), *encino memelito* or Lacey oak (*Q. laceyi*); *encino duraznillo* or Canby oak (*Q. canbyi*) and *encino blanco* or white oak (*Q. laeta*). Some of the associated species are *madroño* or madrone (*Arbutus xalapensis*), *cerezo negro* or American cherry (*Prunus serotina*), and *nogal encarcelado* or Mexican walnut (*Juglans mollis*). Some of the pine elements are present but in low density.

Discussion

There is enough pattern variation in both *gaigeae* and *montana* to suggest two possible answers to the taxonomic problem of what are their specific relationships to one another. The first possibility: They are one species, and *quinquelineata* is the oldest name, therefore they should be recognized as *Rhadinaea quinquelineata gaigeae*, *R. quinquelineata montana*, and the nominate subspecies *R. q. quinquelineata*. The second possibility: As each appears to be allopatric to each other, and there are localities situated on isolated mountains within various habitat types that probably maintain gene pools that select for survival of that particular pattern type, such as the western slopes that are drier and maintain a distinctive three dark stripe pattern for *gaigeae* within the overall range of a five dark stripe pattern on the eastern slope. The five dark stripe pattern in *quinquelineata*, *montana* and *gaigeae* may represent an overall genetic response to environmental conditions for survival on more moist slopes. Each, as proposed by Myers (1974) is on its own evolutionary trajectory, and represents a separate species.

Summary

We have presented two possible scenarios to the taxonomy of *R. montana*, *R. gaigeae* and *R. quinquelineata*. We have been troubled over the past 20 years by the variation in patterns in both *gaigeae* and *montana*, suggesting either genetic variation in pattern from single clutches, or genetic variation due to environmental variables in demes across the range of these taxa. In either case, variation exists, suggesting possible gene flow



Cañón de San Isidro. Submontane forest habitat for *Rhadinaea montana*. Photograph by David Lazcano.

Sierra San Antonio Peña Nevada. Pine-Oak forest habitat for *Rhadinaea montana*. Photograph by David Lazcano.

between demes of a once single population of snakes. These populations are now allopatric, due to alteration of habitat over time, and in the absence of gene flow between populations, developing into isolated species. Or, as suggested above, have already reached that state of taxonomic clarity, and evolutionary trajectory, and are distinct species. We believe the former scenario is more likely true, and suggest that subspecies make a more believable taxonomic arrangement. However, a genetic comparison of these taxa may prove we are wrong.

Acknowledgments

We thank the curators, Linda Trueb, University of Kansas Museum of Natural history; Toby Hibbitts, Texas Cooperative Wildlife Collection, Texas A&M University; and George Zug, United States National Museum, for making museum loans available for our examination of specimens. We thank Heather Prestridge, Curator of Ichthyology, Texas Cooperative Wildlife Collection, for her technical skill in preparing the figures for publication.

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What We Missed at the May Meeting

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All the way through school I was annoyed when my studies interrupted my extracurricular activities, which probably accounts for my sad state of mental competency, although I suspect being short-changed somewhat by biology doesn't help. Interruptions by "real" life continued into my adult and working world, frequently keeping me from pursuing those activities that I really wanted to instead of the requirements to put bread in my mouth and shelter over my head. Retirement was supposed to bring relief from all that necessary stuff, but of course it didn't, so once more I missed a meeting. I really wanted to be there for our May meeting because the speaker was to be Cindy Steinle and I really wanted to experience her presentation. The best laid plans . . .

Photograph of Cindy Steinle by Dick Buchholz.

If you've taken even a little notice of the business workings of your society you have at least seen Cindy's name. She's been the recording secretary for the CHS for several years, but that tells you little about her personality. I don't like to write these accounts when I've not actually attended, but I've known Cindy long enough and well enough that I feel somewhat safe in trying to convey her talk without straying too far from her intent.

First allow me to introduce you to Cindy. Cindy does not so much occupy a space as own it. She assumes that she is right where she should be, doing what she should be doing, and that if you happen not to like it, you're wrong. She has a delightful sense of irony. Her first slide showed her face partially hidden between her blond bangs and her computer which sports a sticker declaring "I am a delicate flower." This from a women who handles crocodilians and giant snakes, hugs Komodo dragons, and rehabilitates pit bulls. She sports some extraordinary tattoos (though I tend to think that any tattoo is extraordinary). She is unstoppable in pursuit of justice for abusers of any animals, especially herps and pit bulls. And yet for those of us who know her, the sticker on her computer reveals a bit of truth as well, for I know of few people with a larger heart than Cindy. She is the president of Small Scale Reptile Rescue in addition to rescuing pit bulls, an education outreach contributor for the International Reptile Conservation Foundation, and a site coordinator for kingsnake.com, where, along with other duties, she advocates for greater acknowledgement of the many women herpers. She travels around the country for these varying roles and is well known in the herp community. She has ample authority for the subject of her talk. Here's how she described it:

"My talk was inspired by Tracy Barker. At the height of the fight against HR669, Tracy called me to ask about statistics on kingsnake.com and we both were very surprised to learn that almost 50% of the user base was female. The reptile community as a whole is often looked upon as a boys' hobby. But with a little research, both Tracy and I stumbled on many women who paved the way for reptile keepers today, originally taking a back seat to their male counterparts. My talk will look at women past and present over the most recent century. I'll look at how they got their starts as well as obstacles they had to overcome. I'll also present the changes the community as a whole has had over time and the roles women now take."

She was asked to present at the International Herpetological Symposium in Fort Worth in July, but when I heard about it I begged her to speak to us. After some reluctance, she agreed. She titled it "The Emerging Role of Women in the Herp Community."

Cindy started with a little ancient history demonstrating the ties between women and herps going back to the bible and Eve, but including Renenutet the Egyptian goddess and Cleopatra and the asp, and, more recently, the Victorian era carnival

Tracy Barker with Cindy. Tracy and her husband Dave run VPI, a home-based snake breeding business that allowed Tracy to be an entrepreneur and a stay-at-home mom. She now mentors and nurtures other women through internships at VPI. Photograph by Clint Gilders.

Kathy Love is the owner of CornUtopia, her corn snake breeding business. She started keeping reptiles in grade school and has coauthored a book about corns. She's extensively involved with the herp world through local herp societies, the internet, mail, and phone. Photograph by Cindy Steinle.

women wrapping themselves with snakes and drawing large crowds. Women and snakes have a history. Then she moved to the twentieth century.

- Grace Olive Wiley (1883–1948) was curator of reptiles at the Brookfield Zoo outside of Chicago from 1934 to 1935. She was an extraordinary individual who was the first recorded person to breed rattlesnakes in captivity and spent her life trying to improve peoples' perceptions of the animals. The CHS has published a monograph about Grace and one of her protégés that is well worth reading.
- Berta Lutz (1894–1976), a zoologist and suffragette who specialized in amphibians and fought for improvements in the lives of the women and children of Brazil.
- Dr. Alice Middleton Boring (1883–1955), an American who spent most of her life in China where she developed and interest in Chinese fauna and spent two years in a concentration camp during World War II.
- Madge Minton (1904–2004), pilot, amateur herpetologist, and wife of Sherman Minton with whom she researched and coauthored several books on herpetology and entomology.

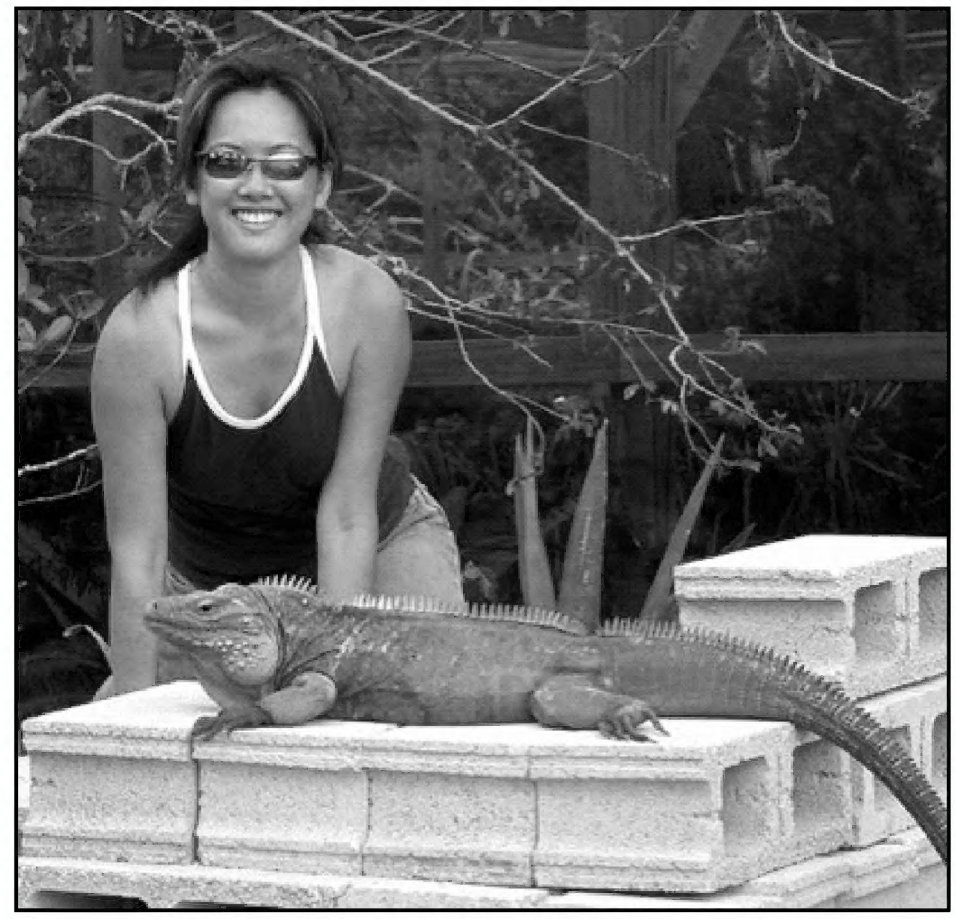
Marisa Tellez has an M.S. from UCLA where she studied the evolutionary and ecological relationships between crocodiles and their parasites. She was inspired by a dinosaur book she read when five. She's received numerous grants, including a National Science Foundation fellowship. Photograph by Renee Chenot-Rose.

- Doris Mabel Cochran (1898–1968), curator at the Smithsonian from 1956 to 1968, published 90 taxonomic papers describing 8 new genera and 125 new species and then retired at age 70 four days before her death.

All of these women were blazing trails not only in the field of herpetology but also in women's rights and many other areas. These were rabble rousing, strong, passionate women who involved themselves fully in many areas of life, much as the women in herpetology today.

Women such as Myrna Wanatabe, Pat Bartlett, Kathy Love, Tracy Barker, and Collette Sutherland continue to advance the struggle for equal recognition in what many still view as a man's field. Many of these women are married to herpetologists but most developed their interests in herps before their marriages. Frequently they had to succeed not only in the face of sexual discrimination but also parental disapproval or at least parental disappointment.

The next generation continues to include women who are succeeding and leading in conservation, propagation, and exploration of herpetology. From Amanda Talaba pursuing an M.S. in evolutionary biology to Desiree Wong who is championing conservation with her involvement in the International Reptile Conservation Foundation and educational outreach, women are increasing their activities in herpetology and continuing to push aside the boundaries that are still being erected around female roles. Cindy Steinle is of this generation and can point to herself as one of the major players. With a charming video clip of seven-year old Anna Sullivan, Cindy closed her presentation. She just scratched the surface of the many women who have done extraordinary work pursuing not only the advancement of herpetology, but also the advancement of women in society, improving the world while they're at it. With luck, you and I may be able to hear Cindy's talk at the IHS. I'm looking forward to it.



Though a software engineer by trade, Desiree Wong is passionate about herp education and conservation. She's done volunteer fieldwork in Grand Cayman with blue iguanas (*Cyclura lewisi*) and travels throughout the U.S. promoting the International Reptile Conservation Foundation. Photograph by Sarah Doty.

Herpetology 2011

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

ORIGIN OF AN ALASKAN GARTERSNAKE

L. A. Neuman-Lee et al. [2011, J. Herpetology 45(1):63-65] note that in an era of rapidly changing environments and greater human mobility and penetration into wild areas, organisms are being discovered in increasingly unexpected places. One such finding was a road-killed juvenile gartersnake outside of Haines, Alaska, in August 2005. The poor condition of the specimen prevented a positive identification based on morphology alone. Furthermore, no snakes are known to be native to this region. Therefore a molecular approach was undertaken to determine the species and geographic origin of the individual. The authors sequenced two partial loci of mitochondrial DNA (cytochrome b and NADH subunit 2) from the Alaska specimen and seven specimens from localities in the lower northwestern United States. Phylogenetic reconstruction using these sequences and additional GenBank samples unambiguously revealed that the Alaska specimen is *Thamnophis ordinoides* and that it shares a haplotype with the northernmost sampled Washington population of *T. ordinoides*. In light of these analyses, the authors assess the likelihood that the specimen represents a relict population, a recent natural colonization, or a fresh introduction.

FACTORS ASSOCIATED WITH AMPHIBIAN DETECTION

G. J. Roloff et al. [2011, J. Herpetology 45(1):15-22] note that large-scale amphibian conservation often relies on remotely sensed data to describe spatial patterns in occupancy. Commonly used data include ownership, forest type, soil class, and proximity of wetlands. The authors evaluated the influence of these variables on terrestrial amphibian occupancy in southern Michigan. Amphibians were trapped using drift-fence arrays in 82 forest patches and detection probabilities were estimated for all captured species. Ten species were captured, but only three were detected at levels suitable for occupancy modeling. The authors concluded that drift-fence arrays alone were not sufficient for adequately detecting the majority of terrestrial amphibians. The best detection models for American toad (*Anaxyrus americanus*), wood frog (*Lithobates sylvaticus*), and spring peeper (*Pseudacris crucifer*) consistently included a positive relationship with temperature and precipitation. Detection-adjusted occupancy models for the three anurans indicated relatively high occupancy (>0.43). Ownership, forest type, and soil class did not occur in higher ranking occupancy models. Rather, the higher ranking models often included the distance to National Wetlands Inventory (NWI) wetland and sample year factors. However, these effects were highly variable and of no use in consistently predicting terrestrial amphibian occupancy. These results substantiate the importance of incorporating detection probabilities into studies of amphibian habitat relationships and suggest that coarse descriptors of environmental conditions may not adequately portray factors important to terrestrial amphibian occupancy.

UV EFFECTS ON NORTHWESTERN SALAMANDERS

R. D. Calfee et al. [2010, J. Herpetology 44(4):572-580] note that solar ultraviolet radiation (UV) has received much attention as a factor that could play a role in amphibian population declines. UV can be hazardous to some amphibians, but the resultant effects depend on a variety of environmental and behavioral factors. The potential effects of UV on the northwestern salamander, *Ambystoma gracile*, from three lakes were assessed in the laboratory using a solar simulator. The authors measured the survival of embryos and the survival and growth of larvae exposed to four UV treatments in controlled laboratory studies, the UV absorbance of egg jelly, oviposition depths in the lakes, and UV absorbance in water samples from the three lakes. Hatching success of embryos decreased in the higher UV treatments as compared to the control treatments, and growth of surviving larvae was significantly reduced in the higher UVB irradiance treatments. The egg jelly exhibited a small peak of absorbance within the UVB range (290–320 nm). The magnitude of UV absorbance differed among egg jellies from the three lakes. Oviposition depths at the three sites averaged 1.10 m below the water surface. Approximately 66% of surface UVB radiation was attenuated at 10-cm depth in all three lakes. Results of this study indicate that larvae may be sensitive to UVB exposure under laboratory conditions; however, in field conditions the depths of egg deposition in the lakes, absorbance of UV radiation by the water column, and the potential for behavioral adjustments may mitigate severe effects of UV radiation.

WOOD FROG EGG-MASS COUNTS

C. J. Raithel et al. [2011, J. Herpetology 45(1):23-27] note that in North America, most efforts to monitor pond-breeding anurans have focused on call surveys. Egg-mass counts offer an alternative monitoring strategy that has been used extensively in Europe because this technique can produce precise and accurate estimates of annual reproductive effort at many study sites. The authors surveyed egg masses of wood frogs (*Lithobates sylvaticus*) at 18 ponds for up to 16 years from 1993 through 2008 in the largest contiguous forest tract in southern New England. They detected an average of 441.5 ± 343.7 egg masses per pond. Based on annual egg-mass counts, coefficients of variation (CV) were slightly higher than previous estimates for this species. No relationships were found between mean annual population size and CV or between length of time series and CV. Population fluctuations in these ponds exhibited evidence of annual synchrony, in part because annual fluctuations at individual ponds were large enough that it was difficult to assess differences in population trends among ponds. However, the overall trend suggests this population was probably increasing slightly, which was expected because ponds were located in contiguous forest that remained intact during the study. Egg-mass counts appear to represent a feasible technique to monitor wood frog populations, given that all local breeding ponds are monitored.

CAPTIVE REPRODUCTION OF A DWARF RACER

A. Landsman and Y. L. Werner [2011, Herpetozoa 23(3/4): 59-65] note that the reproductive biology of the dwarf racers, genus *Eirenis*, is little known. They report on captive reproduction episodes from two pairs of *Eirenis levantinus* Schmidtler, 1993, from the southern limit of the range, and compare with data from the north of the range. Individuals reproduced at least to the age of nine years. Clutch size was 3–5 eggs. Average egg size at oviposition was between 20 × 4.9 and 30 × 10 mm, with a mass of approx. 2.2 g. Oviposition occurred between late June and mid-.Iuly. Incubation lasted, depending on temperature, 44–50 days. Hatchlings measured 120–145 mm total length, and weighed 1.00–1.25 g. Depending on temperature, juveniles sloughed first at an age of 10–14 days, and a second time 34–40 days later. A partial brief review of recent reports on congeners includes two cases of *Eirenis rothii* laying clutches of two eggs measuring approx. 25 × 5 mm.

EFFECTS OF CUBAN TREEFROG REMOVAL

K. G. Rice et al. [2011, Herpetologica 67(2):105-117] note that Florida is home to several introduced animal species, especially in the southern portion of the state. Most introduced species are restricted to the urban and suburban areas along the coasts, but some species, like the Cuban treefrog (*Osteopilus septentrionalis*), are locally abundant in natural protected areas. Although Cuban treefrogs are known predators of native treefrog species as both adults and larvae, no study has demonstrated a negative effect of Cuban treefrogs on native treefrog survival, abundance, or occupancy rate. Capture–mark–recapture techniques were used to monitor survival, capture probability, abundance and proportion of sites occupied by Cuban treefrogs and two native species, green treefrogs (*Hyla cinerea*) and squirrel treefrogs (*Hyla squirella*), at four sites in Everglades National Park in southern Florida. After at least 5 mo of monitoring all species at each site they began removing every Cuban treefrog captured. They continued to estimate survival, abundance, and occupancy rates of native treefrogs for 1 yr after the commencement of Cuban treefrog removal. Mark–recapture models that included the effect of Cuban treefrog removal on native treefrog survival did not have considerable Akaike's Information Criterion weight, although capture rates of native species were generally very low prior to Cuban treefrog removal. Estimated abundance of native treefrogs did increase after commencement of Cuban treefrog removal, but also varied with the season of the year. The best models of native treefrog occupancy included a Cuban treefrog removal effect at sites with high initial densities of Cuban treefrogs. This study demonstrates that an introduced predator can have population-level effects on similar native species.

REDISCOVERY OF AN ENDANGERED FROG

J. H. Townsend et al. [2011, The Herpetological Bulletin (115): 22-25] report the discovery of *Plectrohyla chrysopleura* at a locality in Refugio de Vida Silvestre Texiguat, Departamento de Atlántida, Honduras. This critically endangered treefrog was previously known only from a single site, 55 km to the east-northeast in Parque Nacional Pico Bonito, where it had not been documented since 1996.

HELLBENDER SPATIAL ECOLOGY

N. G. Burgmeier et al. [2011, Herpetologica 67(2):135-145] used radiotelemetry to examine the seasonal home range, movement patterns, and habitat use of 21 eastern hellbenders (*Cryptobranchus alleganiensis alleganiensis*) within the Blue River drainage of southern Indiana. Individuals were located up to three times weekly from July 2008 through October 2009. Mean 100% minimum convex polygon (MCP) home-range sizes were much larger than previously reported and largest during the summer. Male MCPs were significantly larger than those of females. Mean linear home-range sizes were also significantly longer in the summer, but did not differ between the sexes. Hellbenders moved very little throughout the year ($\bar{x}$ = 14.1 movements per individual) and over relatively short distances ($\bar{x}$ = 27.5 m) to nearby shelter rocks. Most hellbenders were routinely located under large, flat shelter rocks; however, five individuals periodically used bedrock, downed trees, and submerged tree root masses along the riverbank. Habitat use of hellbenders was similar to that found in other studies, with 79.5% of locations being on a gravel substrate. These results provide essential information about a declining, low-density population of hellbenders in need of management.

AQUATIC CAECILIANS IN COLOMBIA

B. Tapley and A. R. Acosta-Galvis [2010, The Herpetological Bulletin (113):23-29] note that the distribution, ecology and habitat requirements of most caecilians are unknown. They reviewed the distribution of the typhlonectid caecilian *Typhlonectes natans* in Colombia using published reports and their own collecting experience. *T. natans* is more widely distributed than previously reported. This species of caecilian is the one most commonly kept in captivity. Published reports regarding the captive requirements of the species are conflicting. The authors recorded environmental parameters in habitats where *T. natans* was found to allow for an improved captive management of the species. Without exception this species was found associated with flowing water. It is apparent that this species disperses into floodplains during the rainy season.

CANNIBALISTIC CANE TOADS

L. Pizzatto and R. Shine [2011, Herpetologica 67(2):118-123] note that pathogen transfer may be an important but poorly understood cost of cannibalism. Does the consumption of smaller conspecifics by cane toads (*Rhinella marina*) result in transfer of viability-reducing parasites such as nematode lungworms (*Rhabdias pseudosphaerocephala*)? Experimental trials confirm that cannibalistic toads can indeed become infected, and these results are probably the first evidence of macroparasite transmission via intraspecific predation in amphibians. The results also show that parasites acquired via cannibalism are viable, develop into fertile adults, and reduce the locomotor performance of the hosts. How cannibalism contributes to nematode transmission and spread in natural populations is not known, but we propose a scenario in which this interaction would be likely to increase the lungworm prevalence, intensity, or persistence.

BLACK PINE SNAKE HABITAT SELECTION

D. Baxley et al. [2011, Herpetologica 67(2):154-166] report that with historical and continued fragmentation of longleaf pine (*Pinus palustris*) forests, an increasing need emerges to identify remaining black pine snake, *Pituophis melanoleucus lodingi*, populations and understand species–environment correlations so that conservation efforts for this taxon are properly directed and appropriate. This study had three main objectives: (1) to use radiotelemetry data in conjunction with GIS modeling to assess multiple scale resource selection for *P. m. lodingi*; (2) to use occurrence data to validate a habitat suitability model; and (3) to quantify microhabitat characteristics of *P. m. lodingi* locality records and evaluate differences in land cover between historical and recent records. At the landscape scale, *P. m. lodingi* selected evergreen forests in upland areas lacking cultivated crops, pasture and hay fields, developed areas, and roads. Within home ranges, *P. m. lodingi* were found closer to scrub/shrub habitat and open areas than expected. The authors' Boolean model reduced the area deemed suitable for *P. m. lodingi* by 84.3%, while accurately categorizing 75% of recent *P. m. lodingi* occurrences, demonstrating the potential for robust model development despite small sample sizes. Significant habitat differences were found between recent and historical *P. m. lodingi* locality records, which corroborated the findings of the Boolean model. Recent sites of occurrence were, on average, 597 m from areas with a model score of "optimal," whereas sites with no recent records were, on average, 1582 m from areas with an optimal score. Recent sites were characterized by significantly less canopy cover, less basal area, less midstory cover, greater percentages of grass, bare soil, and forbs in the ground cover, less shrubs and litter in the ground cover, and a more recent burn history than sites with no recent records. Areas containing historical *P. m. lodingi* populations are simultaneously becoming unsuitable at both the landscape and microhabitat scales. The authors believe that the Boolean modeling approach represents a cost-effective way to plan for informed management actions for snake taxa of conservation concern.

CANNIBALISM IN AMERICAN ALLIGATORS

M. F. Delaney et al. [2011, Herpetologica 67(2):174-185] examined mortality of juvenile (<122 cm total length; TL) American alligators (*Alligator mississippiensis*) attributed to cannibalism on Orange Lake, Florida. Alligator web tags used in mark–recapture studies were found in 12% of 267 stomachs sampled from alligators ≥168 cm TL. Captive alligators retained 76% of force-fed tags during a 588-d tag-retention trial. Models relating the probability of tag recovery to the annual probabilities of juvenile survival, cannibalism, tag retention, adult survival, and adult harvest suggested that cannibalism may on average remove 6–7% of the juvenile alligator population annually. Vulnerability continued to 140 cm TL (age 6–8 yr). Cannibalism of juveniles may serve to regulate the alligator population on Orange Lake. Alligator cannibalism may vary widely among populations, depending on demography and environmental conditions. The role and importance of cannibalism in alligator population dynamics should be more fully assessed and environmental and population factors that influence cannibalism identified to better evaluate management programs.

MICHIGAN MASSASAUGA SURVIVAL RATES

R. L. Bailey et al. [2011, Herpetologica 67(2):167-173] note that the eastern massasauga rattlesnake, *Sistrurus catenatus catenatus*, is a candidate for US federal listing and is legally protected in every state or province in which it occurs. Habitat degradation and human persecution have contributed to range-wide population declines. Survival estimates are essential for a thorough understanding of population dynamics, yet are rarely reported for *S. c. catenatus* in the peer-reviewed literature. There has been little research on massasauga survival in managed areas of Michigan, the state considered to be the last *S. c. catenatus* stronghold. The authors' objectives were to estimate survival of massasaugas during the active season (May–October) in southwestern Lower Michigan and describe causes of mortality. They captured (mid-May to late August), radiomarked, and monitored 27 adult massasaugas in 2008 and 2009 and pooled data for analyses. Snakes were observed throughout the active season and survival was estimated (Mayfield method) for that period (11 May–29 October; 168 d). Cause-specific mortality was investigated qualitatively. Estimated survival probability for the active season was 0.9472 (95% CI = 0.8518–1.0000), higher than any estimate for similar studies of which we are aware. The single mortality event observed was caused by predation. The high massasauga survivorship in this area might be attributable to habitat management for *S. c. catenatus* combined with a relative lack of infrastructure and human persecution. The results suggest that adult *S. c. catenatus* survival is potentially geographically variable and can be high in areas not well-investigated, such as southwestern Lower Michigan. More research would yield long-term survival trends for the studied population as well as throughout their range.

PREHENSILE-TAILED SKINK HOME RANGES

I. J. Hagen and C. M. Bull [2011, J. Herpetology 45(1):36-39] note that *Corucia zebrata* (Scincidae) is endemic to the Solomon Archipelago and widely distributed across the island group. *Corucia* is evolutionarily distinct and diverged from its nearest relatives about 30 MYA. Little is known about its life history, basic ecology, or behavior in the wild. The authors conducted a six-week study of movement patterns of *C. zebrata* on the island of Ugi to determine home-range sizes and overlap among conspecifics. Twenty-five lizards were fitted with radio transmitters and were followed for periods of 5–38 days. Telemetry results indicated that the average home range over the period studied was equivalent to the canopy of one tree. Radio-tagged individuals were located more often in the canopy than on the trunk of the tree, where humans typically search for the lizards. The home range is smaller than expected for a similar-sized herbivorous lizard occupying a terrestrial habitat, but the small home range is consistent with results from other arboreal animals. The study increased knowledge of the behavior and habitat preferences of an ecologically unusual lizard species. It was noted that conventional survey methods, searching tree trunk habitats, have low detection probability, an important consideration for further ecological studies of the species, in particular for the purpose of assessing its conservation status.

Unofficial Minutes of the CHS Board Meeting, May 13, 2011

The meeting was called to order at 7:44 P.M. at the Wildlife Discovery Center in Lake Forest. Board member Greg Brim was absent.

Officers' Reports

Recording Secretary: Cindy Rampacek read the minutes of the April 15 board meeting and they were accepted as read

Treasurer: Andy Malawy presented the financial report. It was discussed and accepted.

Membership Secretary: Mike Dloogatch read a list of memberships due to expire.

Sergeant-at-arms: Greg Brim could not be present at the board meeting, but he reported having counted 59 people at the April meeting.

Corresponding Secretary: Deb Krohn got all the requested thank-you notes out. She received a very kind response from *Chicago Parent*. She also presented the cell phone prices. Mike Dloogatch moved to authorize Deb Krohn to purchase an inexpensive phone. Aaron LaForge seconded and it was passed unanimously.

Publications Secretary: Aaron LaForge has updated the list of future speakers on the CHS website.

Committee Reports

Shows:
- Notebaert, First full weekend of each month
- Meet the Creek, Kiwanis Park, Brookfield, June 11
- Millennium Park family fun tent, June 13 & 19
- Cosley Zoo, Father's Day weekend, June 18–19
- Argonne Labs picnic, July 16
- SEWERFest, July 31
- Unity Fest at Marquette Park, September 10
- Unity Walk at Soldier Field, September 24
- Snake Day at the Milwaukee Public Museum, November 5

Old Business

Spring picnic: May 21 at the Wildlife Discovery Center in Lake Forest. Cindy is bringing all the paper goods, Lawrence will grab pasta salad, Dick is still thinking, Jessica is bringing chips and dip.

St. Louis Zoo trip: Postponed until September. We will be carpooling due to the high cost of bus rental.

New Business

ReptileFest 2012: Set for April 14–15. Looking for volunteers to serve on the organizing committee.

The Animal Medical Center of Chicago would like a speaker on general reptile husbandry. Anyone interested should talk to Jason Hood.

Round Table

John Archer mentioned that Greg Brim was out of town for a family issue. John is also bailing on Cindy's talk.

Jessica has a new job and she is very happy about that. She also has new art that she is working on. She is collecting snake sheds, and asked for any to be passed along to her.

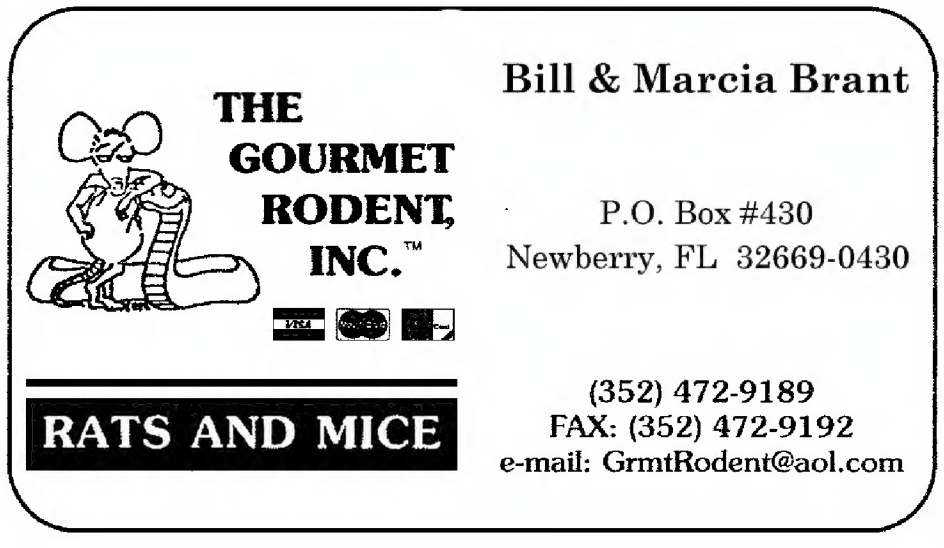
Deb shared that Animal Planet was very interested in the story of the wayward box turtle she had originally gotten from Ron Humbert. They are coming out to film an episode on the "Frog Lady."

Gavin Brink gave an impassioned testimonial for Herpstat 4 (thermostat/vivarium control). He is amazed with the ramping option.

Jason Hood wanted to share that his fiancée Barbara will be living in Chicago soon.

The meeting was adjourned at 9:15 P.M.

Respectfully submitted by recording secretary Cindy Rampacek



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For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, PO Box 430, Newberry, FL 32669-0430, 352-472-9189, E-mail: GrmtRodent@aol.com.

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For sale: **high quality frozen feeders**. Over a decade of production and supply. Seven sizes of mice availabe: small newborn pinks up to jumbo adults. Prices start at $25 per 100. Feeders are separate in the resealable bag, not frozen together. Low shipping rates. Free price list. Kelly Haller, 4236 SE 25th Street, Topeka KS 66605, (913) 234-3358 evenings and weekends.

For sale: herp books. *Harry Frauca's Book of Reptiles* by Harry Frauca, l966, 100 pp., 100 b&w and 12 color photos, contains some experiences collecting Australian reptiles including carpet python and lace monitor, DJ with three tears, otherwise excellent condition, hardbound, $35; *Snakes of South-east Queensland* by Patrick Couper and Andrew Arney, 2007, 68 pp., one to three color photos of each of the 56 species, published by Queensland Museum, good information, small pocket-size, softbound, $16; *Lizards of Western Australia 2: Dragons and Monitors* by Storr, Smith, and Johnstone, 1983, 114 pp., 20 color plates with two to eight photos each, range maps, descriptions, distribution, bibliography, softbound, $30; *The Snakes of Victoria* by John A. Coventry and Peter Robertson, 1991, 70 pp., many color photos, range maps, 6 figs., descriptions and natural history info, published by Museum of Victoria (Australia), softbound, $30; "Not as Black as It's Painted" by Rick Shine, l2-page article on red-bellied black snake in the April-June 1997 issue of the *Australian Geographic*, 15 color photos, contains Shine's research results, this l28 pp. journal of the Australian Geographic Society contains other authoritative articles, news and ads of interest to Australophiles, $18. Publicatons in excellent condition unless othewise noted. Books subject to prior sale. $3 postage and handling for orders under $25, free for $25 and over in the U.S. William R. Turner, 7395 S. Downing Circle W.; Centennial, CO 80122 telephone (303) 795-5128; e-mail: toursbyturner@aol.com

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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, June 29, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. This will be our popular and always well-attended annual **Show & Tell** meeting. Bring an animal that you find interesting for one reason or another and be prepared to give a short (under five minutes) presentation to the group. Don't be shy. Neither age (yours) nor commonness (the animal's) should be a limitation.

Speaking at the July 27 meeting will be **John Palis**, a consulting biologist from Jonesboro, Illinois. His talk is titled "Conservation status of flatwoods salamanders on the southeastern United States Coastal Plain." Reticulated flatwoods salamanders (*Ambystoma bishopi*) and frosted flatwoods salamanders (*Ambystoma cingulatum*) — two closely-related salamanders endemic to the southeastern United States—have suffered rangewide population declines that mirror the loss of the highly-endangered longleaf pine ecosystem upon which they depend.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

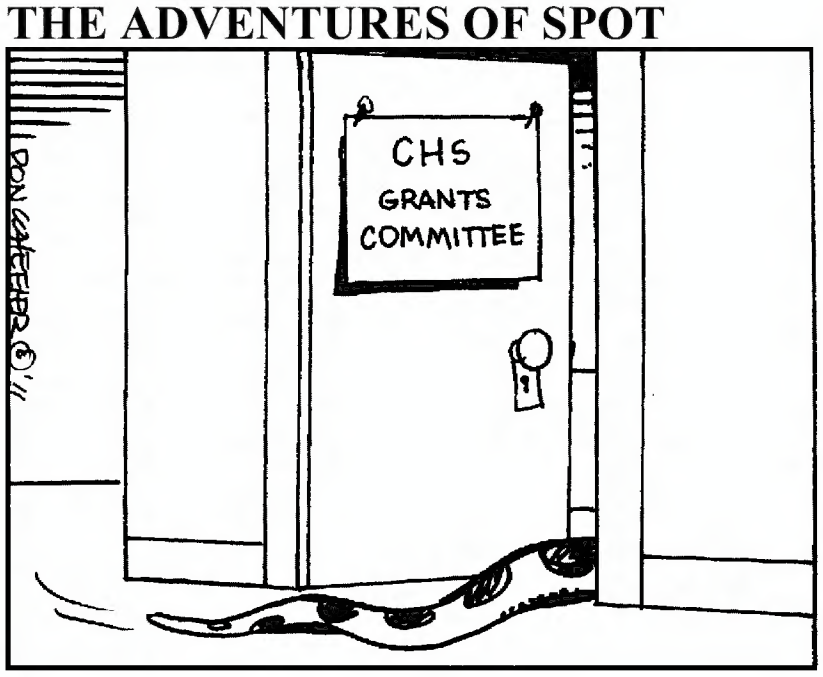
Board of Directors Meeting

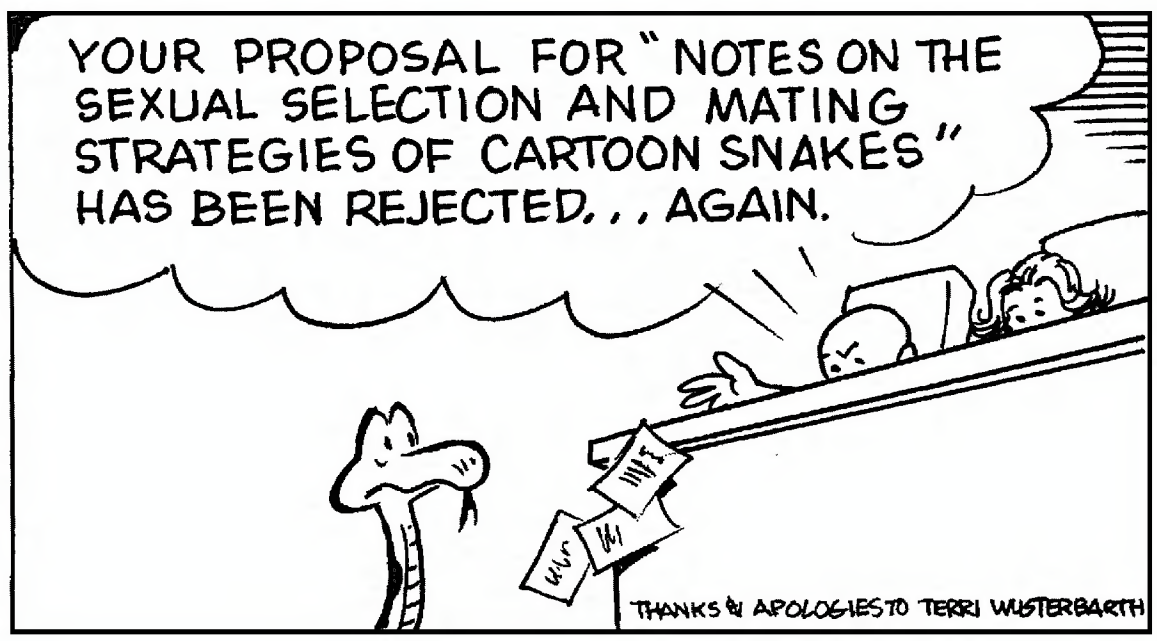
Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., July 15, in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the CTC website: http://www.geocities.com/~chicagoturtle.

THE ADVENTURES OF SPOT




YOUR PROPOSAL FOR "NOTES ON THE SEXUAL SELECTION AND MATING STRATEGIES OF CARTOON SNAKES" HAS BEEN REJECTED. . . AGAIN.
THANKS & APOLOGIES TO TERRI WUSTERBARTH

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